

A NEW SPECIES OF *OCADIA*
(TESTUDINES: BATAGURIDAE)
FROM HAINAN ISLAND, CHINA

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Abstract. — A new species of batagurine turtle, *Ocadia philippeni*, is described from Hainan Island, China. Similar to and sympatric with *Ocadia sinensis*, it differs from that species by having fewer broad neck stripes, a ventral pinkish-orange wash, a wider plastron, a relatively shorter interfemoral seam and bridge, and a relatively longer gular scute.

Originally described by Gray (1834) as *Emys sinensis*, the Chinese stripe-necked turtle was placed in the monotypic genus *Ocadia* by the same author in 1870. All subsequent authors have recognized *Ocadia* as a monotypic genus (see Wermuth & Mertens 1977). *Ocadia sinensis* is known from Taiwan, Hainan Island, and on the Asian mainland from southeastern China to central Vietnam (Iverson 1986). No extant subspecies have been described, although Taiwan specimens have more faded plastral blotches than those from other locations (Pritchard 1979). Tao (1988) described *O. sinensis changwui* from a single partial carapace found in late Pleistocene sediments off the west coast of Taiwan. However, the diagnosis used highly variable carapacial scute shape characters; hence, the validity of this fossil taxon awaits a comparison with additional fossil and recent osteological material.

Over the past two years Mr. Oscar Shiu sent McCord a series of distinct stripe-necked batagurine turtles from China. These turtles apparently were found sympatrically with *Ocadia sinensis* and are more similar to that species than to any other Chinese turtle. They are described herein as the second species of the genus *Ocadia*, even though skeletal material is not yet available for definitive generic placement (e.g., McDowell

1964, Hirayama 1984, Gaffney & Meylan 1988).

In honor of Hans-Dieter Philippen, we name this distinctive species

Ocadia philippeni, new species
Philippen's stripe-necked turtle
Fig. 1c, d

Holotype. — UF #80766, an adult female, preserved in alcohol; reported to have been collected near Kancheng [18°51'N, 108°37'E; =48 km from Tungfang (19°03'N, 108°56'E)], western Hainan Island, China; purchased from local people by Mr. Oscar Shiu, in the spring of 1988 or 1989.

Paratype. — UF #80765, a juvenile male, preserved in alcohol; same data as holotype.

Diagnosis. — A large species of *Ocadia* (Table 1) with a moderately tricarinate carapace with the anterior neural bones anteriorly short-sided; an unhinged plastron; four yellow, black-bordered lateral head and neck stripes separated by narrow brown stripes (at least eight black-bordered, narrow, cream to yellow stripes in *O. sinensis*); ventral surfaces of shell and skin washed with pinkish-orange even in adults (cream to yellow in *O. sinensis*); a relatively short bridge and broad plastron (bridge length usually less than 90% of anterior width of plastral hind-lobe in *O. philippeni*; more than 80% in *O.*

Table 1.—Morphometric characters useful in discriminating among species of the genus *Ocadia*. Character abbreviations are interfemoral seam length (IF), maximum gular scute length (GL), bridge length (BL), and anterior width of plastral hindlobe (PW3). Values are means followed by range in parentheses.

Sample	Sex	<i>n</i>	Carapace length (mm)	IF/GL	IF/PW3
<i>O. philippeni</i>					
Hainan	M	7	169.0 (113–199)	1.01 (0.72–1.43)	0.31 (0.26–0.41)
	F	2	216.7 (214–219)	1.18 (1.16–1.20)	0.33 (0.33–0.33)
<i>O. sinensis</i>					
Hainan	M	9	125.3 (107–155)	1.48 (1.08–1.80)	0.43 (0.39–0.47)
	F	7	146.8 (114–220)	1.31 (1.09–1.47)	0.37 (0.34–0.42)
Taiwan	M	4	177.7 (155–200)	1.32 (1.13–1.56)	0.39 (0.31–0.45)
	F	9	201.0 (176–235)	1.33 (1.15–1.60)	0.38 (0.33–0.45)
China	M	2	133.5 (117–150)	1.56 (1.51–1.60)	0.43 (0.39–0.47)
	F	2	261.0 (251–271)	1.52 (1.47–1.56)	0.42 (0.37–0.47)
Vietnam/Laos	M	4	180.1 (136–245)	1.62 (1.40–2.04)	0.42 (0.38–0.46)
	F	5	188.8 (116–258)	1.39 (1.18–1.68)	0.40 (0.36–0.43)
Total	M	19	143.4 (107–200)	1.48 (1.08–2.04)	0.42 (0.31–0.47)
	F	23	187.0 (114–271)	1.35 (1.09–1.68)	0.38 (0.33–0.47)

sinensis); and a relatively short interfemoral seam and long gular scute (interfemoral seam length usually less than 120% of maximum gular length in *O. philippeni*; more than 110% in *O. sinensis*) (Fig. 2).

Description (based on two adult females, six adult males, and one juvenile male, including the types).—Carapace length (CL) to at least 199 mm in males and at least 219 mm in females, elliptical, moderately tricarinate and domed (maximum shell height/CL = 0.355 to 0.402; mean = 0.369), widest at the level of marginal (M) 8 (maximum carapace width/CL = 0.685 to 0.762; mean = 0.720), with a smooth to slightly serrated posterior margin, and with moderately obvious growth annuli. M1, 7, 8, and 9 largest, approximately coequal in length; M11 smallest; M4, 8, or 9 tallest; M8–11 distinctly flared. Cervical scute small, generally rectangular, but wider posteriorly than anteriorly, and longer than wide. Vertebrales (V) 2–5 wider than long; V1 variable in relative length versus width, but not contacting seam between M1 and M2; V5 usually not contacting M10. Medial keel least pro-

nounced on V5; weaker lateral keels most pronounced on costals C2 and C3. Carapace rusty brown to nearly black; if brown, carinae marked with dark brown to black. A black blotch on ventral posterolateral quadrant of each marginal, although sometimes blotch covers nearly half of the ventral surface of each marginal.

Maximum plastron length shorter than carapace length (PL/CL = 0.96–1.00 in females; 0.90 to 0.94 in males). Plastron slightly upturned anteriorly, with no hinge present. Plastral forelobe width (PW1) at level of junction of humeropectoral seam and lateral plastral margin 40.0% (range 39 to 43%) of carapace length. Anterior width of plastral hindlobe (PW3: at lateral junction of abdominofemoral seam) 44.9% (range 43 to 46%) of carapace length. Plastral hindlobe with relatively deep anal notch (medial depth of notch averages 53% of interanal seam length; range 31 to 105%). Bridge moderately long (bridge length/CL = 0.32 to 0.40, mean = 0.35; BL/PW3 = 0.73 to 0.88, mean = 0.78); single large axillary and inguinal scutes on each bridge.

Table 1.—Extended.

GL/BL	BL/PW3
0.41 (0.36–0.49)	0.76 (0.73–0.81)
0.32 (0.31–0.33)	0.88 (0.87–0.88)
0.33 (0.26–0.40)	0.89 (0.84–0.95)
0.33 (0.29–0.35)	0.88 (0.85–0.94)
0.35 (0.32–0.39)	0.85 (0.79–0.91)
0.31 (0.25–0.34)	0.92 (0.88–0.96)
0.28 (0.28–0.29)	0.98 (0.92–1.03)
0.30 (0.28–0.31)	0.92 (0.88–0.96)
0.32 (0.26–0.36)	0.83 (0.79–0.86)
0.34 (0.30–0.36)	0.86 (0.79–0.93)
0.33 (0.26–0.40)	0.88 (0.79–1.03)
0.32 (0.25–0.36)	0.90 (0.79–0.96)

Average plastral formula: interabdominal seam (IAB) > interpectoral seam (IP) ≫ interfemoral seam (IF) ≥ intergular seam (IG) > interanal seam (IAN) > interhumeral seam (IH). Interfemoral seam length/maximum gular length = 1.05 (0.72 to 1.43). Plastron pink to orange (Fig. 1), with a large (covering up to 50% of scute), black blotch on older portion of each scute (nearly completely faded on the humerals, pectorals, and abdominals in one specimen). A smaller black blotch also occurs on the bridge area of the pectoral and abdominal scutes, and occasionally on the axillary and inguinal scutes.

Head narrow; upper jaw unhooked; triturating surfaces of medium width, without ridges. Small tubercles evident between angle of jaw and tympanum. Dorsum uniform olive green to olive brown. Four narrow longitudinal black-bordered yellow stripes on side of head, separated by narrow brown or olive stripes. Dorsal-most stripe incomplete anteriorly. Middle two stripes originating at eye; upper one passing dorsal to tympanum and lower one passing across tympanum.

Ventral-most stripe originating at angle of jaw. All stripes except most dorsal extending to base of neck. Chin yellow, with or without two small concentric black circles, but with seven black-bordered longitudinal stripes (often discontinuous) extending from level of tympanum to base of neck. Tomia flecked with black. Black horizontal line across eye (through pupil); iris yellow-green.

Anterior surface of antebrachium covered with large, imbricate scales, the largest 3 of which are sickle-shaped; largest scales on hindlimb at heel, but much smaller than largest forelimb scales. Upper parts of limbs and tail finely scaled. Exposed parts of forelimbs salmon to orange and heavily mottled with olive, brown, and/or black; a narrow, black-bordered salmon to orange stripe runs along anterior margin of forelimb to foot. Exposed parts of hindlimbs olive-green to brown to black dorsally and salmon ventrally; posterolateral margins with longitudinal black stripes. Recessed areas of skin salmon (usually) to orange to yellow. Tail relatively long, black dorsally, with a pair of longitudinal dorsolateral brown stripes extending from base of tail at least halfway to end of tail. Ventral tail pink or orange, with little to much black mottling, concentrated around the anus.

Males with a slightly concave plastron; females with a flat or convex plastron. Males with longer tails than females; vent at or beyond level of posterior carapace margin in males; anterior to it in females.

Other material.—One adult female and six adult males (all topotypic); alive in the collection of William P. McCord (WPM 1–7); to be deposited on death in the UF collection.

Distribution.—Known only from “near Kancheng.” The precise locality could not be determined since the turtles were collected by local people.

Natural history.—Oscar Shiu reports that carapace length exceeds 36 cm and individuals reach 2.7 kg in mass. In captivity a

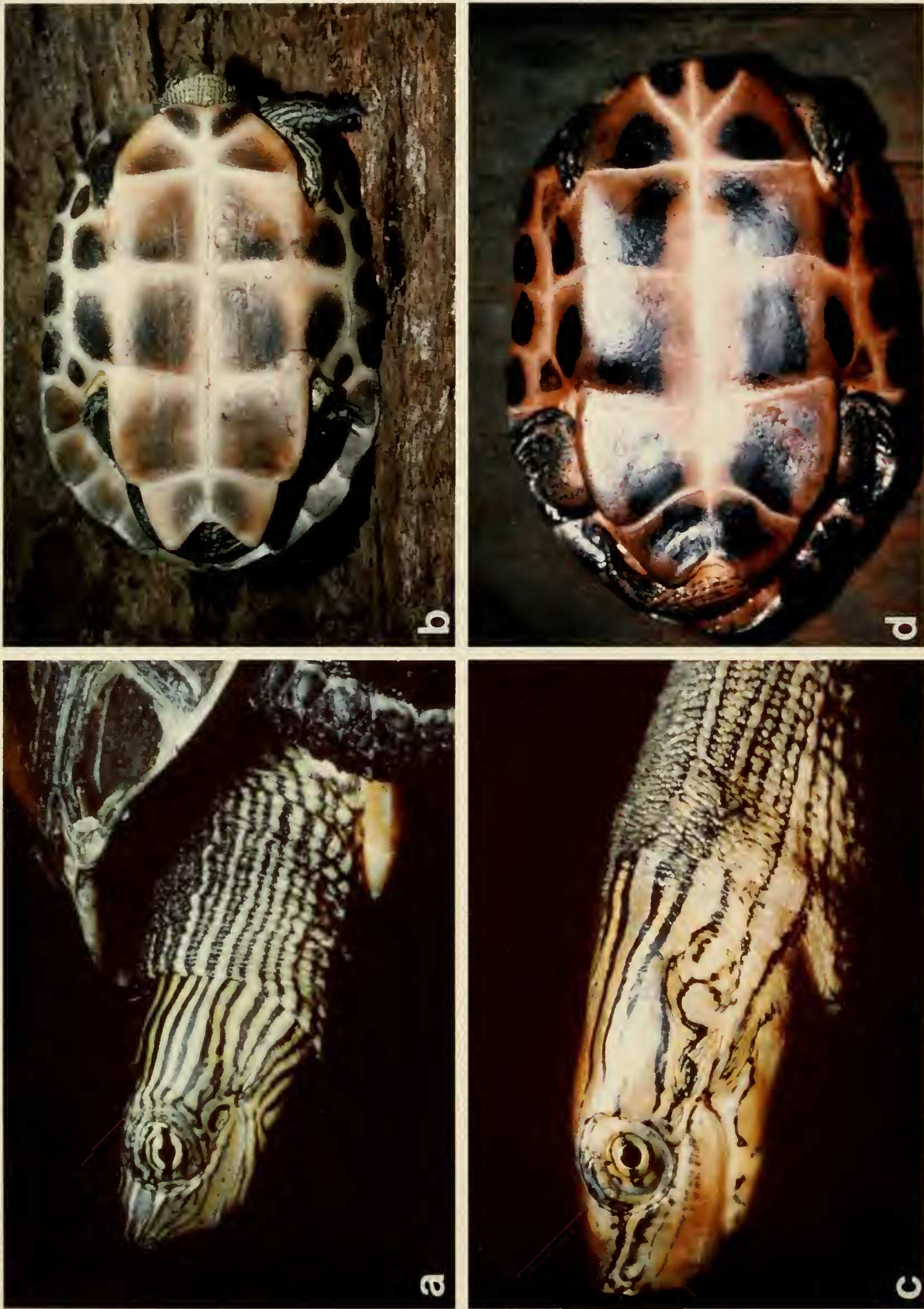


Fig. 1. Comparison of head patterns and plastra of male *Ocadia sinensis* (a, b) and *O. philippeni* new species (c, d); 199 mm carapace length; specimen alive in WPM collection).

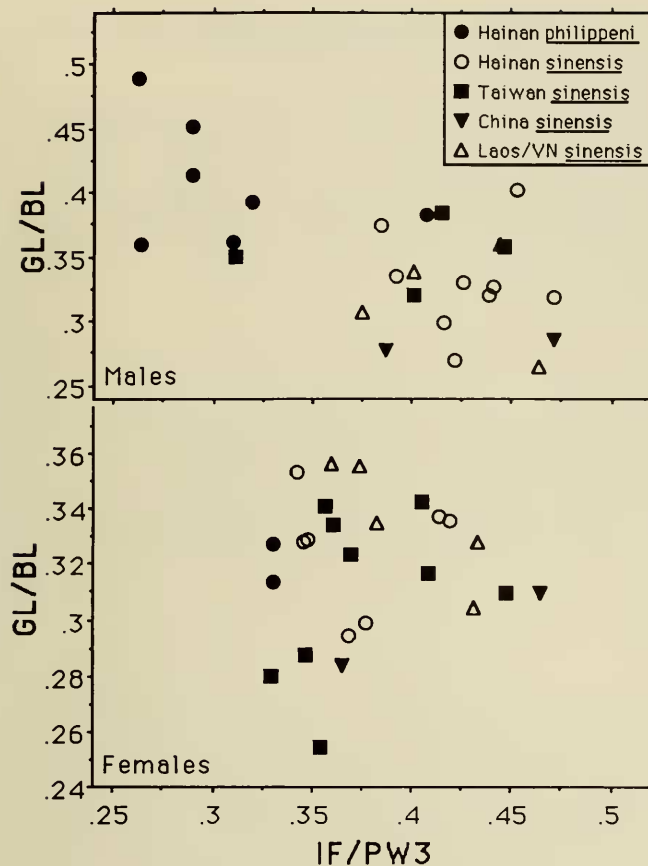


Fig. 2. Bivariate plot of the relationships among male (top) and female populations of the species of the genus *Ocadia* based on the characters IF/PW3 (interfemoral seam length/anterior width of plastral hind-lobe) and GL/BL (maximum gular length/bridge length).

topotypic female (214 mm carapace length) laid six brittle-shelled, oblong eggs (mean length = 39.76 mm, range 38.7–41.6; mean width = 24.53 mm, range 24.0–25.2) in late October 1989.

Specimens examined.—(see Acknowledgments for acronyms) *Ocadia sinensis*: Laos (UF 80817–19 [3 specs]; WPM 1, alive), North Vietnam (MCZ 21051; UF uncatalogued [1 spec]; WPM 1–3, alive), Taiwan (FMNH 121230–32, 127172–73, 127175–78, 127180, 195492, 199750–51), China, Hainan Island (AMNH 30173, 30176–78, 30183–84, 30186–91, 30193, 30195–96; FMNH 6613 [formerly AMNH 30194]; MCZ 20687; MVZ 23940; UF 80816 [1 skeleton]), and China, mainland (BMNH 1947.3.5.26 [holotype]; MVZ 23943; WPM 1–2, alive). *Ocadia philippeni*:

China, Hainan Island (UF 80765–66 [types]; WPM 1–7, alive).

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